JACC Vol. 15, No. 2
February 1990:96A

COLOR DOPPLER MAPPING OF AORTIC REGURGITATION IN AORTIC STENOSIS: COMPARISON WITH ANGIOGRAPHY

Gerard Aurigemma, M.D. F.A.C.C., Steven Whitfield, M.D., Andrea Sweeney, Linda Pape, M.D., F.A.C.C., Bonnie Weiner M.D.,F.A.C.C. U Mass Medical Center, Worcester MA.

We compared results of color doppler (CD) to angiographic (A) grading in 32 patients (pts) with aortic stenosis (AS) (mean valve area=.7 cm^2) suspected of having clinically significant aortic regurgitation (AR). CD mapping of AR from parasternal long axis (PLA), short axis and apical views was confirmed by pulsed doppler. Maximal jet length (JL), area (JA), and height (JH), were measured in all relevant views and outflow tract height (LVOH) was measured in the PLA view. AR severity was graded by long axis JH/LVOH ratio with 1; 1-24%, 2;25-46%, 3;47-64%, and 4; >65% for CD and 1+ - 4+ by A. CD demonstrated AR in all 27 pts positive by A. As expected neither JA nor JL discriminated pts by angiographic grade. Four of five pts. without AR by A had either absent or grade 1 AR by CD. Though there was considerable overlap of CD grades in pts. with 1+ AR by A, grade 3 or 4 AR by CD was always associated with 3+ or 4+ AR by A. Conversely, 3+ or 4+ AR by A had significantly higher JH/LVOH ratio than 1+ ($p < .04$). Short axis jet mapping was only possible in 8/24 pts. and did not improve on JH/LVOH grading.

Thus CD sensitively depicts AR in AS pts and current CD criteria correctly identify pts with 3+ or 4+ AR by A. Methods for distinguishing among milder grades require further evaluation.

THE EFFECT OF SHOCK WAVE LITHOTRYPSY ON CALCIFIED STENOTIC AORTIC VALVES

A.Hartmann,G.Rosenbohm,E.Matura#,G.Kober, M.Kaltenbach,Frankfurt University,Medical Center and #Siemens AG,Erlangen,W.-Germany

To determine if electromagnetically generated shock wave lithotrypsy has potential application for treatment of stenotic, calcified aortic valves, 38 cusps of surgically excised human aortic valves were studied. Valves were weighed,photographed and calcium deposition was determined by x-ray.Stiffness was determined by palpation and by measuring the pressure gradient generated in a perfusion system Valves were exposed to shock waves at 16 or 18 kV with 200 or 400 impulses each.20 valves reacted to exposure to shock waves with a reduction in pressure gradient of 1.9±.2 cm H_2O(8%) .Calcified valve area was reduced by 3.5±1.3 mm^2(7%).Valves without changes in pressure gradient showed a reduction of 7.1±2 mm^2(14%) of calcified valve area.There was no significant difference in weight loss. Using a small focus (4 mm) there was a significant reduction in pressure gradient and calcified valve area, but not in weight;with a large focus (8 mm) reduction in calcified valve area, gradient and weight was significant ($p>0.05$). Changes in valve stiffness were independent of weight loss and reduction in calcified valve area.Conclusion: Shock wave lithotrypsy is capable of reducing stiffness of calcified aortic valves presumably by fragmentation of tissue calcium deposits.

AORTIC VALVE REPLACEMENT IN THE ELDERLY: OPERATIVE RISKS AND LONG-TERM RESULTS

Kit Arom, M.D., Demetre Nicoloff, M.D., William Lindsay, M.D., William Northrup, M.D., Thomas Kersten, M.D., Robert Emery, M.D., Minneapolis Heart Institute, Minneapolis, MN

The current National Interest in palliative aortic valvuloplasty prompted us to review our experience of 273 pts who were 70 yrs or older and underwent aortic valve replacement (AVR) at the Minneapolis Heart Institute and St. Paul Heart and Lung Center during 1978-1989.

There were 158 males and 115 females with a mean age of 75.1±4 yrs (70-89 yrs old). The early mortality was 5%. (6% for AVR, 162 pts and 3.6% for AVR+CABG, 111 pts) Follow-up was completed in 96% of the pts with mean follow-up of 33.4±27 months (9130.4 pts months). Late mortality was 18% (20.3% for AVR, 14.4% for AVR+CABG. Valve complications included: 10 thromboembolisms (5 AVR, 5 AVR+CABG); 7 hemorrhagic complications (4 AVR, 3 AVR+CABG); 1 prosthetic endocarditis and 1 valve explant.

ACTUARIAL ANALYSIS*

	Incidence free (%)			Pt survival*(%)	
	TE	HC	ED,VRD,AC	Overall	ED Excluded
AVR	92.7±4	92.8±3	56.4±5	65.9±5	70.4±5
AVR+CABG	94.3±2	97.3±1	71.2±5	75.5±5	78.3±5

*At 5 yrs

TE=Thromboembolism,HC=Hemorrhagic Complication,ED=Early Death,VRD=Valve Related Death,AC=All Complications

Operative mortality was low in this particular group of elderly pts. Long term follow-up showed 98% are now in NYHA Class I & II (95% Class II & III preop). The procedure is safe and effective; 5 yr survival rate of these pts are close to those of general population (74% with similar age group).

IS EXERCISED-INDUCED LEFT VENTRICULAR DYSFUNCTION IN AORTIC REGURGITATION SUBSTANTIATED BY A HISTOLOGICAL SUBSTRATUM.

J.P. Bassand, F. Schiele, Y. Bernard, R. Faivre, G. Coulon, E. Ranfaing, J.P. Maurat.
University Hospital, 25000 BESANCON-FRANCE

In chronic aortic regurgitation (AR), excercise induced LV (ExLV) dysfunction is supposed to represent an intermediate stage between normal LV function and permanent LV dysfunction at rest and to be a predictor of long term outcome. However ExLV dysfunction could only represent afterload mismatch elicited by stress. To test this hypothesis, 36 pts with chronic AR were submitted to LV endomyocardial biopsy and subsequent histomorphometric analysis. Cell damage was graded according to a semiquantitative method. Interstial fibrosis (%IF) and mean cell diameter (cell Diam) were determined with an objective computer assited method. 8 patients had a normal rest and exercise LV function (G1), 20 an Ex LV dysfonction (G2) and 7 a permanent LV dysfunction (G3).

	Cell lesions	Cell diam	%IF	Age
G1	1.7±0.8	26±7	20±5*	36±13*
G2	2.1±0.9	29±6	22±4**	50±14**
G3	2.3±0.7	30±6	28±6	61±6

*$P < 0.05$ between G1 ant G3

**$P < 0.05$ between G2 and G3

A significant inverse relationship was found between %IF and LVEF ($R=-0.50$, $P < 0.01$) and direct relationship between %IF and endsystolic volume. On the other hand an inverse significant relationship was found between LVEF variations during exercise and age ($r=-0.60$, $P < 0.01$).

These results tend to show that exercise-induced LV dysfunction is not related to a specific stage of myocardial alterations but rather to age. Higher systemic resistance at rest and lesser decrease of systemic resistance during exercise may result in higher afterload in older patients.